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IX. *On a fossil human Skeleton from Guadaloupe.* By Charles König, Esq. F. R. S. In a Letter addressed to the Right Hon. Sir Joseph Banks, Bart. K. B. P. R. S.

Read February 10, 1814.

MY DEAR SIR,

British Museum, Dec, 20, 1813.

THE human skeleton imbedded in limestone, lately brought from Guadaloupe by the Hon. Sir ALEXANDER COCHRANE, and presented by the Admiralty to the British Museum, having excited the curiosity of the public, I do myself the honour of submitting to you a short account of these fossil remains, which, (though fully aware of the weight of those arguments you lately urged in conversation, as unfavourable to the probability of their high antiquity) I am still led to consider as not altogether uninteresting to the geologist. The neglect of the more recent formations of rocks was one principal cause that the nature and origin of the older had been so strangely misunderstood: it is to the more attentive observation that has of late years been paid to the phenomena which they present, that we are indebted for the knowledge of the important fact, that secondary fossils are the productions and depositions of various periods; by which happy discovery the study of these remains, formerly a puerile and frivolous pursuit, has become a most important branch of natural science. The osseous relics of a later period are more particularly calculated to furnish data for the future construction of a philosophical

theory, at least of the crust of the earth. It appears therefore strange, that these latter, although they speak a far more intelligible language than the rest, should, till within a very short period, have been almost entirely disregarded by the speculative geologist. Bones, the most distinctly organized, were so very imperfectly understood, even in the beginning of the last century, that Dr. CARL, in his *Ossium fossilium docimasia*, published at Frankfurt in 1704, found it necessary to employ all his powers of reasoning, aided by chemical analysis, to prove that they were neither *lusus naturæ*, nor the results of a *vis plastica* of the earth. At a still later period, the principal value put upon the discovery of these fossil bones, was derived from the supposed proof they afforded of the former existence of a gigantic race of men, or from the evidence they were supposed to give in behalf of an universal deluge: and it is curious to observe, to what a degree men eminent for science, but very deficient in critical acumen, have been led astray in their speculations, under the influence of preconceived notions.

CAMPER and BLUMENBACH were among the first who thought of connecting the subject of osseous fossil remains with systematic geology. The former of these naturalists had, at first, controverted the doctrine of the extinction of genera and species as incompatible with divine providence; but, afterwards adopting it himself, he alludes to a prior creation to that of man, in the following passage, which, I suppose, has never been quoted: “Hodie, quam plurima extintorum (animalium) “specimina in Museo meo reperiunda, et meditationes magis “seriæ, persuaserunt mihi, sapientiæ Divinæ non repugnare “legem, qua res illas vel animalia illa desinere jubeat, simulac

“ scopo primario nobis incognito satisfecerunt penitus. Con-  
“ victus etiam quam maxime sum, orbem nostrum variis illis  
“ ac horrendis catastrophis fuisse expositum aliquot seculis  
“ antequam homo fuit creatus: nunquam enim hucusque videre  
“ mihi contigit verum os humanum petrifactum, aut fossile,  
“ etiamsi Mammonteorum, Elephantorum, Rhinocerotum,  
“ Bubalorum, aliorumque perplurima viderim ossa.” Nova  
Act. Petrop. Tom. II. p. 251.

But on the history of the strata produced by the more recent catastrophes of the globe (and it is the formation of these alone which can be scrutinized with any reasonable prospect of success) most light has been thrown by the indefatigable exertions of M. CUVIER. Superlatively skilled in comparative anatomy, this gentleman has succeeded in determining the fossil bones of no less than seventy-eight species, of which forty-nine are entirely unknown among the existing race of animals; about twelve are identified with known species, and the remainder strongly resemble existing species, although their identity has not been completely ascertained. From the multiplied observations which this naturalist has communicated in his numerous memoirs, we may gather that the viviparous quadrupeds appear at a much later period in the fossil state than the oviparous; the latter being probably coeval with the fishes, whilst the former are found only in the newest formations, in which, according to BRONGNIART and CUVIER's interesting discovery, marine beds are observed to alternate with those of fresh water, and which (in the neighbourhood of Paris) overlay the coarse shell limestone which constitutes the last strata formed, as it would appear, by a long and quiet stay of the sea on our continent.

All the circumstances under which the known depositions of bones occur, both in alluvial beds and in the caverns and fissures of Fletz limestone, tend to prove, that the animals to which they belonged met their fate in the very places where they now lie buried. Hence it may be considered as an axiom, that man, and other animals whose bones are not found intermixed with them, did not co-exist in time and place. The same mode of reasoning would further justify us in the conclusion that, if those catastrophes, which overwhelmed a great proportion of the brute creation, were general, as geognostic observations in various parts of the world render probable, the creation of man must have been posterior to that of those genera and species of mammalia, which perished by a general cataclysm, and whose bones are so thickly disseminated in the more recent formations of rocks.

The many instances of Anthropolithi described by authors, from SCHEUCHZER's famous "*Homo diluvii testis et Θεοσκοπος*," to SPALLANZANI's mountain of human bones in the island of Cerigo, have all proved not to be what they were taken for by the ignorant in osteology, and cannot, therefore, be adduced in objection to the above reasoning. Still less are the incrustations of human bones, (from the once celebrated skeleton preserved in the Villa Lodovisi at Rome, to the skull found in the Tiber, and preserved in the British Museum,) calculated to subvert it; nor is the hypothesis likely to be greatly invalidated by the subject of this letter, with whose history, however, several circumstances are connected which appear to preclude the probability of a very recent deposition, or which, at least, require further elucidation, before its relative age can be pronounced upon with any degree of confidence.

The human skeletons from Guadeloupe are called *Galibi* by the natives of that island; a name said to have been that of an ancient tribe of Caribs of Guiana; but which, according to your plausible conjecture, originated in the substitution of the letter *l* instead of *r* in the word *Caribee*. I find no mention made of them by any author, except General ERNOUF, in a letter to M. FAUJAS ST. FOND, inserted in Vol. V. (1805) of the *Annales du Muséum*; and by M. LAVAISSE, in his *Voyage à la Trinidad*, &c. published in 1813. The former of these gentlemen writes, that on that part of the windward side of the Grande-Terre, called *La Moule*, skeletons are found enveloped in what he terms “*Masses de Madrépores pétrifiées*,” which being very hard, and situated within the line of high water, could not be worked without great difficulty, but that he expected to succeed in causing some of these masses to be detached, the measurements of which he states to be about eight feet by two and a half.

The block brought home by Sir ALEX. COCHRANE exactly answered this account, with regard to the measurements; its thickness was about a foot and a half. It weighed nearly two tons; its shape was irregular, approaching to a flattened oval, with here and there some concavities, the largest of which, as it afterwards appeared, occupying the place where the thigh bone had been situated, the lower part of which was therefore wanting. Except the few holes evidently made to assist in raising the block, the masons here declared that there was no mark of a tool upon any part of it; and indeed the whole had very much the appearance of a huge nodule disengaged from a surrounding mass.

The situation of the skeleton in the block was so superficial,

that its presence in the rock on the coast had probably been indicated by the projection of some of the more elevated parts of the left fore-arm.

The operation of laying the bones open to view, and of reducing the superfluous length of the block at its extremities, being performed with all the care which its excessive hardness and the relative softness of the bones required, the skeleton exhibited itself in the manner represented in the annexed drawing (Pl. III.), with which my friend Mr. ALEXANDER, has been so good as to illustrate this description.

The skull is wanting; a circumstance which is the more to be regretted, as this characteristic part might possibly have thrown some light on the subject under consideration, or would, at least, have settled the question, whether the skeleton is that of a Carib, who used to give the frontal bone of the head a particular shape by compression, which had the effect of depressing the upper and protruding the lower edge of the orbits, so as to make the direction of their opening nearly upwards, or horizontal, instead of vertical.\*

The vertebræ of the neck were lost with the head. The bones of the thorax bear all the marks of considerable concussion, and are completely dislocated. The seven true ribs of the left side, though their heads are not in connexion with the vertebræ, are complete; but only three of the false ribs are observable. On the right side only fragments of these bones are seen; but the upper part of the seven true ribs of this side are found on the left, and might at first sight be taken for the termination of the left ribs; as may be seen in the drawing. The right ribs must, therefore, have been violently

\* See the excellent figures in BLUMENBACH'S *Decades*.

broken and carried over to the left side, where, if this mode of viewing the subject be correct, the sternum must likewise lie concealed below the termination of the ribs. The small bone dependent above the upper ribs of the left side, appears to be the right clavicle. The right os humeri is lost; of the left nothing remains except the condyles in connexion with the fore-arm, which is in the state of pronation: the radius of this side exists nearly in its full length, while of the ulna the lower part only remains, which is considerably pushed upwards. Of the two bones of the right fore-arm, the inferior terminations are seen. Both the rows of the bones of the wrists are lost, but the whole metacarpus of the left hand is displayed, together with part of the bones of the fingers: the first joint of the fore-finger rests on the upper ridge of the os pubis, the two others, detached from their metacarpal bones, are propelled downwards, and situated at the inner side of the femur and below the foramen magnum ischii of this side. Vestiges of three of the fingers of the right hand are likewise visible, considerably below the lower portion of the fore-arm, and close to the upper extremity of the femur. The vertebræ may be traced along the whole length of the column, but are in no part of it well defined. Of the os sacrum, the superior portion only is distinct: it is disunited from the last vertebra and the ilium, and driven upwards. The left os ilium is nearly complete, but shattered, and one of the fragments depressed below the level of the rest: the ossa pubis, though well defined, are gradually lost in the mass of the stone. On the right side, the os innominatum is completely shattered, and the fragments are sunk; but towards the acetabulum, part of its internal cellular structure is discernible.



The thigh bones and the bones of the leg of the right side are in good preservation, but being considerably turned outwards, the fibula lies buried in the stone, and is not seen. The lower part of the femur of this side is indicated only by a bony outline, and appears to have been distended by the compact limestone that fills the cavities both of the bones of the leg and thigh, and to the expansion of which these bones probably owe their present shattered condition. The lower end of the left thigh bone appears to have been broken and lost in the operation of detaching the block; the two bones of the leg, however, on this side, are nearly complete: the tibia was split almost the whole of its length a little below the external edge, and the fissure being filled up with limestone, now presents itself as a dark coloured straight line. The portion of the stone which contained part of the bones of the tarsus and metatarsus was unfortunately broken; but the separate fragments are preserved.

The whole of the bones, when first laid bare, had a mouldering appearance, and the hard surrounding stone could not be detached without frequently injuring their surface; but after an exposure for some days to the air, they acquired a considerable degree of hardness. Sir H. DAVY, who subjected a small portion of them to chemical analysis, found that they contained part of their animal matter, and all their phosphate of lime.

The calcareous rock in which these bones are imbedded, is an aggregate, composed principally of zoophytic particles, and the detritus of compact limestone: it readily dissolves in diluted nitric acid, without leaving any evident residue. Its general colour is greyish yellow, passing into yellowish grey.

When more closely examined, it is found to consist of yellowish grains, intermixed with others of a more or less deep flesh red colour. These grains, though minute, are in some parts of the mass perfectly defined, and in close contact with each other, although no cement is perceptible; in other parts they are, as it were, confluent, forming a more or less porous mass; in others again they form a compact mass, in which the former distinct concretions, especially the red ones, are only indicated by a difference of colour.

The red grains that enter the composition of the rock, appeared at first view to be particles of red coral (*isis nobilis*), which has hitherto been found only in the Mediterranean; but on closer examination, their structure proved them to be the detritus of a millepora, and indeed one fragment of a larger size than the rest renders it probable that it is *millepora miniacea* of PALLAS. The last mentioned fragment was coalesced with a piece of very compact white madrepore, and intimately connected with the surrounding mass. Shells also are found in this rock: the one most distinct is a helix, approaching in form and size to *helix acuta* of MARTINI, (Conchiol. Vol. IX. Pl. XXX. fig. 224.), but differing in the form of the whorls which are less convex and distinct, and have three bands on the body volution, instead of one. Another shell, of which a few only were discovered in the mass, appears to be *turbo pica* of LINNÆUS in a worn state: the brown spots are still distinctly seen on its surface. Dr. LEACH intends to dedicate a plate of one of the next numbers of his "*Zoological Miscellany*" to the illustration of these and some other shells related to them.

Besides these bodies, I found, near the surface of the block,

part of a bone of a concentric lamellated structure, apparently the fragment of a tusk, but of what animal I am unable to determine; also a large fragment of a basaltic stone; and here and there small nests and dots of a black powdery substance, which, from its decomposing nitre with great energy, appears to be pure charcoal.

The hardness of this limestone, as calculated by the degree of impression made upon it by the mason's saw and chisel, surpasses that of statuary marble.

From this description of the rock, it will be sufficiently clear, that it is by no means of a stalactical nature, and cannot therefore be compared either with travertino, or any other chemical calcareous deposition of this kind. Its origin seems unquestionably to be similar to that of common sandstone, only that the grains of which it is composed have in some parts become confluent, and formed a nearly compact limestone. Whether this last circumstance be not in part owing to the admixture of the gelatinous matter of the bones and muscular parts of the body of which it is the remains, I am not prepared to decide; certain it is, that the mass approaches more to the compact state in the immediate vicinity of the bones, than at a distance from them. Dr. THOMSON informs me that he has found traces of phosphate of lime in this stone.

Respecting the age of these fossil remains, if not much positive information can be derived from the preceding details, they will prove at least, that the enveloping rock is not of a stalactic nature, and that the bones, after they were deposited, underwent a degree of violence which dislocated and fractured them, without removing the fragments to a distance from each

other. It may therefore be safely concluded, that the surrounding mass must have been in a soft or semi-fluid state, which, whilst it opposed no effectual resistance to a shock from without, readily filled up the chasms produced by it.

From the composition of the stone, a late period may, perhaps, be assigned to its formation; yet there is nothing in the above description that necessarily implies a very recent origin. For although there are many instances of gravel and sand being quickly formed into hard masses; and even art has availed itself of this circumstance to produce from the granitic detritus a complete regenerated granite (in which cementation of loose siliceous grains oxyd of iron is well known to be a powerful agent), yet we know of no limestone being formed as it were under the eyes of men; for stalactically concreted limestone, as I have already observed, should not be confounded with this.

SAUSSURE (as you had the goodness to point out to me) mentions, indeed, sands on the shore near Messina, which, by means of a calcareous juice from the sea, as that writer expresses himself, acquire a degree of hardness, which renders them fit to serve for mill-stones; but it would appear, from the context, that the sand thus agglutinated is siliceous.

The circumstance of these bones not being actually petrified, and even retaining part of their gluten, though considered by some as a proof of their recent deposition, is by no means conclusive; for there does not seem to be any reason why lapidification of organic bodies should ever take place, under circumstances unfavourable to that remarkable process: accordingly, the bones in the Fletz limestone caverns, and in the breccia of Gibraltar, Dalmatia, Cette, &c. appear not to have

made the least progress towards a petrified state. Most of the ivory employed in Russia is derived from the tusks of the fossil extinct species of elephant; and even the osseous remains of the plaister quarries of Paris, according to VAUQUELIN'S analysis, have yielded animal matter. Shells also may, for a considerable lapse of time, escape the influence of petrifying causes; a remarkable instance of which we have in the calcareous rock of Maestricht, which, together with the remains of extinct species even of amphibious animals, encloses shells but very little altered from their original state.

The attention of geologists being now directed towards this object, it may be expected that a scientific examination of the circumstances under which this limestone occurs, will not fail ere long to fix its age, and assign to it the place it is to occupy in the series of rocks. All our present information respecting the *grande terre* of Guadaloupe amounts to this, that it is a flat limestone country, derived principally from the detritus of zoophytes, with here and there single hills (*mornes*) composed of shell limestone; while Guadaloupe properly so called, separated from the other part by a very narrow channel of the sea, has no trace of limestone, and is entirely volcanic. It is the opinion of father LABAT, who is followed by BUFFON, that the *grande terre*, of a far more recent origin than the other part of Guadaloupe, was originally a shoal covered with corals, which emerged from the deep in consequence of the retreat of the sea. Others, who have visited those parts, such as Messrs. PEYRE, HAPPEL, AMIC, &c. find in the irregularity of stratification and the tumultuous manner, in which, as they tell us, the shells are dispersed in the rocks composing the *grande terre*, a strong indication, that this portion of the island

owes its existence to the same subterraneous energies, which still manifest themselves in the eruptions of the *Souffrière*.

M. LAVAISSE, to whom I alluded above, as the only author who mentions the galibies, except General ERNOUF, speaks of the bed of limestone which encloses them, as the most remarkable of the calcareous rocks in the Leeward islands; I therefore expected to find in his work an exact statement of its mode of occurring; but the only positive information I could collect from this author is, that the bed is a *kilomètre* (nearly an English mile) in length, and that it is covered by the sea at high water. According to him, no trace of shells or organized bodies are discoverable in this rock; but in lieu of these he was fortunate enough to meet with mortars, pestles, hatchets, &c. of a basaltic or porphyritic rock, which, we are informed, were petrified (*petrifiés*). From this very vague account, I should not be induced to lay much stress upon the circumstance that the position of the skeletons is east-west, and that the spot must, therefore, have been a cemetery, which time and circumstances have transformed into a hard calcareous rock.

I have to apologize to you, my dear Sir, for this very long letter on a subject which may possibly turn out to be interesting only so far, as the human bones from Guadeloupe are unquestionably the only bones we are acquainted with that have ever been found imbedded in a hard stony mass, that does not appear to belong to common stalactical calcareous depositions. This circumstance admits of being easily ascertained by a close inspection of the locality; and I am perfectly of your opinion, that a comparison of the nature of the different varieties of shell sand with which the neighbourhood of the Caribee islands

abounds; would alone be sufficient to remove many doubts relative to the origin of the bed in question. The sand from thence, which I had an opportunity of seeing, was unlike that of which the stone is composed.

I have the honour to remain, with every sentiment of respect,  
my dear Sir,

your most obedient

and obliged servant,

CHARLES KONIG.





